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# Comparison of Psychometric Properties of Balance Assessment Tools for Older Adults

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# Comparison of Psychometric Properties of Balance Assessment Tools for Older Adults

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Kelsey Johnson and Shannon Funk

This CAT examines the reliability and validity of popular age-normed balance assessment tools (Berg Balance Screen, Tinetti Balance Assessment, and Mini-BESTest) with older adults

### 1Ask: Research Question

What is the most valid and reliable age-normed assessment tool for measuring balance among older adults?

### 2aAcquire: Search Terms

Databases: ClinicalKey, ProQuest, PubMed

Search Terms: Berg Balance Scale, Tinetti Balance Scale, Balance, Balance Assessment Sub-Acute, Age Normed Balance Assessments, Reliability Validity Balance Assessment, Balance and Psychometric

### 2bAcquire: Selected Articles

**Park (2018):** A meta-analysis examining fall risk assessment tools for the elderly across settings in regards to predictive validity.

**Telenius, Engedal, & Bergland (2015):** A cross-sectional study that examines the inter-rater reliability of the Berg Balance Scale (BBS), 30 s chair stand test (CST), and 6 m walking test, as well as construct validity of BBS in nursing home residents with mild-to-moderate dementia.

**Godi, Franchignoni, Caligari, Giordano, Turcato, & Nardone (2013):** Prospective single-group study that compares reliability, validity, and responsiveness of the Mini-BESTest and BBS in individuals with balance disorders.

### 3aAppraise: Study Quality

**Park (2018):** Level 1. 33 articles selected for review. Analyzed fall risk assessment tools across settings. Exclusion of studies with participants < 60 years old. Includes studies from community-dwelling and inpatient settings.

**Telenius, Engedal, & Bergland (2015):** Focused on nursing home patients and assesses reliability and validity of commonly used balance assessments. Small sample size (N=33) and inclusion of only nursing home residents. International study: unclear if it can generalize to United States populations.

**Godi, Franchignoni, Caligari, Giordano, Turcato, & Nardone (2013):** Examined a variety of balance disorders and commonly used balance assessments. 99 participants with one of 10 diagnoses were included. Limitation of convenience sample from a single rehabilitation facility.

### 3bAppraise: Study Results

**Park (2018):** BBS is most useful tool for identifying older adults with low fall risk (AUC=.97, ICC=.995). Tinetti was found to have insignificant evidence of predictive validity (p=.57)

**Telenius, Engedal, & Bergland (2015):** All 3 assessment tools have high inter-rater reliability. BBS had weighted k scores from .83-1, indicating excellent inter-rater reliability. Cronbach's alpha of BBS= .948.

**Godi, Franchignoni, Caligari, Giordano, Turcato, & Nardone (2013):** Test-retest reliability and inter-rater reliability of Mini-BESTest had a mean score of 11.1(7.6), while BBS had a mean score of 38.4(14.2). Cronbach's alpha at baseline/follow-up for Mini-BESTest was .90/.91, and for BBS was .93/.93. Test retest reliability was significant at p<.001. Of the two, the Mini-BESTest has better test-retest reliability while BBS has higher internal consistency, though they are both significant.

Assessment	Tinetti	BBS	Mini-BESTest
Inter-rater reliability (ICC score)	N/A	.995(Park, 2018), .97(Godi, Franchignoni, Caligari, et al., 2013)	.98(Godi, Franchignoni, Caligari, et al., 2013)
Sensitivity (ability to predict those with a balance deficit)	.68, p=.57 (Park, 2018)	.73, p=.0001 (Park, 2018), 77, p=.05 (Godi, Franchignoni, Caligari, et al., 2013)	94, p=.05 (Godi, Franchignoni, Caligari, et al., 2013)
Specificity (ability to predict those without a balance deficit)	.56, p=.03 (Park, 2018)	.90, p=.21 (Park, 2018), 97, p=.05 (Godi, Franchignoni, Caligari, et al., 2013)	81, p=.05 (Godi, Franchignoni, Caligari, et al., 2013)
Age Normed?	Yes	Yes	Yes
Time to Administer	10-15 minutes	15-20 minutes	10-15 minutes
Items Measured	9 Balance, 8 gait	14	14
Cost	Free	Free	Free



### 4Apply: Conclusions for Practice

Both the Mini-BESTest and Berg Balance Scales were found to be reliable and valid at measuring change in functional balance. The Tinetti was found to be the least valid and reliable assessment for measuring balance in older adults. The Mini-BESTest appears to have a lower ceiling effect and slightly higher reliability compared to the BBS. This could increase accuracy when demonstrating improvement in balance function for reimbursement. These two assessments have high inter-rater reliability suggesting that they can be used by different therapists with similar results. The Mini-BESTest examines dynamic balance such as reactive postural control and gait, which is unexplored by the BBS.

### References

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Clinical Bottom Line: The Mini-BESTest is the most valid and reliable assessment for measuring balance in older adults.

